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TRUE COLOR VALUES IN PHOTOGRAPHY.*

OF all the important advances during the present time, within the scope of the photographic field, no discovery is of greater epochal importance than the process which enables us to produce photographic pictures whose shadings reproduce in entirety the true color values of the colored original. From the first it was always charged that the greatest shortcoming of photography, in contrast to its general fidelity and truthfulness to the original, was that the picture was not alone lacking the animating charm of its natural coloring, but was often reproduced in shadings which were not in true relation with the real color values of the different pigments in the original. For instance, certain dark colors, such as ultramarine blue, cobalt blue, and violet, were reproduced much lighter than they appear in reality to the human eye; while certain light colors, chrome yellow, orange, several shades of red, etc., were reproduced much darker.

The result of this condition was that in all cases where the beauty of the subject consisted in the harmonic color graduations, photography fell far short of the requirements.

To overcome this apparent shortcoming of photography, the aim has been of all photographic experts to find some medium which would excite the sensitiveness of the photographic plate, for the heretofore latent chemical rays, to so great an extent that the latter would produce an action which would cause their impression on the sensitized plate in its true color value. In these researches the first aim was to discover why the sensitive chemicals then used in photography were not equally sensitive for all rays.

As far back as 1870 Schultz-Sellack, spurred on by the generally accepted theory which had been current for the previous twenty years, "that only such rays exert chemical action on a body which are absorbed by that body," followed this course of research, and found that only such rays act upon salts of silver which are sufficiently absorbed by such salts.

Shortly afterwards Dr. H. W. Vogel stated, as the result of spectral-analytic experiments, that the light-sensitive property of the photographic plates did not alone depend upon the color-absorbing properties of the sensitive silver-salts alone, but

* A free translation from Messrs. David and Scolik's "Orthoskiagraphische Photographie." Band II. Wilhelm Knapp, Halle A. S., with additional notes by the translator.

that the color-absorbing properties of added substances also played an important part; and further, that consequently we were enabled to sensitize bromide of silver for any desired color at will, or, in other words, to increase the sensitiveness of the plates for certain colors by adding a substance which absorbed the certain color, and thus increase the chemical reduction of the silver bromide.

These desirable sensitizing mediums were found in certain coloring matter, which was added to the light-sensitive preparations. In this manner photographic plates were produced which, when the active rays (blue and violet) were reduced by absorption in a transparent yellow medium, such as a color-screen, showed an increased sensibility for the usually dormant light rays.

This discovery was really the result of an accident. Vogel, during one of his spectrographic experiments, found that one sort of English collodion dry plates, which were tinted with yellow to prevent solarization, gave certain colors of the spectrum truer than the ordinary collodion plate. Through this accidental discovery Vogel was induced to try various coloring matter, among which corallin proved the most useful. The first successful experiment in this line dates back to the year 1873, at which time Vogel succeeded in photographing yellow lighter than dark blue or violet. He obtained this result with bromide of silver plates dyed with corallin, used in connection with a yellow color-screen.

The experiment was made on an object having a yellow ground crossed by a broad blue band. First an iodide of silver collodion plate was tried; the result, a white band on a black ground. With a bromide of silver (corallinized) no image was obtained; but the same plate used with the addition of a yellow color-screen between lens and plate, which absorbed the blue rays and transmitted the yellow without reduction, resulted in a negative which produced prints showing a dark band upon a light ground.

Further experiments, however, soon established the fact that all coloring matter by no means contained the properties requisite to sensitize the photographic plate for the absorbed rays. It was further found that a number of such mediums as increased this absorption of rays at the same time weakened the sensibility of the emulsion for rays of other shades.

The most useful of these coloring mediums were found among the coal-tar products, especially cyanin. In 1874 Becquerel came to the front with his claims for chlorophyl; while five years later Mr. Fred. E. Ives, of Philadelphia, published in the *Philadelphia Photographer*, December, 1879, the results of his experiments in obtaining true photographic color values. This was the first published process of photographing all colors correctly. His efforts at first did not attract the interest they deserved, even ridicule and opprobrium being heaped upon him by certain European parties. All this, however, did not cause him to cease his researches, and in 1884 he published his paper, "Isochromatic Plates by Means of Chlorophyl," in the *Photographic News* (London, Sept., 1884).*

In this line of research especial credit is due V. Schuman, of Leipzig, for his

* In 1886 the Committee on Science and the Arts of the Franklin Institute [Philadelphia] made an investigation of Ives' claim to first practical success in correct color-tone photography, indorsed his claim, and awarded him the "John Scott Legacy Medal" for the discovery and publication of his process.—*Journal of the Franklin Institute*, October, 1886.

spectral-analytic experiments, and later also to Abney, Attout, Clayton, Carey-Lea, and Dr. J. M. Eder, who published the results of their experiments.

Shortly afterwards numerous experiments were made by Dr. F. Mallmann and Ch. Scolik, in the photo-chemical experimental laboratory, for the purpose of establishing the practical uses of the published results and deductions of the above-named investigators. It was by these practical tests that Scolik called attention to the advantages of erythrosin, and which resulted in the almost universal adoption of erythrosin as a color-sensitizing medium.

The next step was to combine the orthochromatic principle with the preparation of the emulsion. Clayton and Tailfer produced gelatine dry plates stained with eosin-ammonia, patented the process, and put the plates on the market. This was followed shortly afterward by Dr. Vogel, who brought out a plate of his own under the name of the "Azalin Plate," which showed a much greater sensibility for orange-yellow than the eosin-ammonia plate. The orthochromatic medium azalin proved to be merely a combination of chinalin-red with cyanin. Dr. J. M. Eder also furnished a color-correct plate at this time, of which eosin was the medium.

When the possibilities of a combination of the orthochromatic principle with the gelatine dry-plate process became generally known, two different methods presented themselves to incorporate the sensitizing coloring matter with the dry-plate emulsion. The first was that of simply immersing the ordinary dry plate for a minute or two in the color solution. The other method was to add the color solution to the fluid emulsion before coating the plates.

For practical reasons, and convenience of the operator, the first process was soon superseded by the latter, as it was found that the ready-prepared plates were more permanent,—*i.e.*, in orthochromatic properties,—and hence came into general use.

Exhaustive experiments made in Europe, however, have demonstrated that the highest orthochromatic perfection can only be attained with the immersed or soaked plate.*

Another great advantage in favor of the latter is the fact that any photographer of average intelligence can at will transform, as the occasion requires, any make of dry plate which he is in the habit of using into an orthochromatic plate of the first quality; the only drawback to this process being that it is not safe to prepare any large number in advance, as the keeping properties are limited. Plates of this kind are especially suited to landscape work. Although the advantages of color-correct plates have thus far received but little recognition by amateurs in this country for general work, the time is near at hand when all photographers who aim at perfection will avail themselves of this medium for reproducing their pictures in the relative correct shades of true color values.

For the benefit of our professional readers we here give the formulæ which in practice have proved to be the best and simplest methods for those who wish to prepare their own plates.

Any of the makes of gelatine dry plates in general use, which work clear and are not of too great rapidity, are suitable for sensitizing by the immersion process.†

* Scolik, p. 260.

† David and Scolik, p. 277. [As a matter of fact different makes of plates are affected differently by the same staining bath; This unfortunate condition can only be overcome by experiment with the special make of plate

Practice has proven beyond any doubt that colors of the eosin group are the most practicable, as in most cases it is of greater importance to have a plate of greater sensitiveness to yellow and orange than one which shows only sensibility to orange and red, such as are treated with cyanin,* and which requires the greatest caution in the various manipulations. Further, only in extreme cases would the demand call for a clear sensibility for red.

Of the above-named group of colors, erythrosin blue has given the best results. The total and orthographic sensitiveness which can be obtained on an ordinary dry plate treated with an ammoniated erythrosin bath is often extraordinary, as the sensibility for yellow becomes so great that with such plates portraits have been successfully taken by petroleum and gas light.

Another curious fact is that this staining process enhances the reliability and equality of the plates, there developing exceedingly clear in the shadows, with less inclination to fog than the ordinary dry plate. Further, the action of the ammonia which is added to the formulæ increases the sensibility of the plate so greatly that the immersed plates not alone regain the sensitiveness which they would otherwise lose by the addition of color, but the general rapidity is greatly increased from what it was before the color treatment, a fact which must not be overlooked by experimenter.†

Strange to say, where the ammoniated color solution is added to the emulsion before the plates are coated, there is no increase in the rapidity of the plates.

The formulæ which proved of great value in the extended experimental investigations of Scolik and his confreres were the the following, viz.:

First carefully dust off the plates with a soft camel's-hair brush to prevent any foreign matter from getting into the bath or spotting the plate.

I.—ACCELERATOR.||

Water, distil.	200 cc.m.
Ammonia	2 cc.m.

Immerse the plate in this solution for two minutes, then drain until they cease to drip, and immerse from 60 to 75 seconds in

II.—COLOR BATH.

Erythrosin solution (1 Erythrosin pure : 1000 water.)	25 cc.m.
Ammonia	4 cc.m.
Water, distil.	175 cc.m.

Above solution should suffice for at least a dozen plates [size not given. Ed.]. It is advisable, however, after the seventh or eighth plate has been stained, to add 1 cc.m. of ammonia. During the operation the pan should be kept carefully covered, and rocked both ways to insure an equalizing action. After the plates are taken out of the

used. The color bath which will work with one, will not work to the same extent of color sensitiveness with others. This difference in the color-absorbing properties of the plate is due to the fact whether the sensitiveness of the emulsion with which the plate is coated was gotten by ammonia or by boiling,—a fact of which the average purchaser of dry plates is entirely in ignorance]. Ed.

* In special cases cyanin is indispensable.—Ed.

† It is a question whether this is true of all makes of commercial plates. Statements have been made that on some plates a simple water solution of the coloring matter produces the same effect.—Ed.

|| Bothomly, whose experiments were all made with English dry plates, claims that his experiments showed no advantage whatever of the use of the accelerating solution.—Ed.

color bath they should be placed on a rack to dry, in a totally dark room of ordinary temperature, and should be fit for use in about three hours. It is requisite that great care be taken with the light during the whole process,—using only a very dark ruby lamp, and working as much as possible in the dark, away from the light.

Above formulæ may be modified by substituting in the same proportions eosin (blue) and Bengal red in place of erythrosin, as the subject may require.

Still greater orthochromatic action than by above formulæ can be obtained by the use of an erythrosin-silver-ammonia solution. This is best prepared in following proportions at night by weak candle light:

Erythrosin solution (1,100)	50 cc.m.
Heat on water bath to 45° C. add to this, drop by drop, a solution of	
Nitrate of silver	1.10,
until no further precipitation takes place, and the fluid appears colorless; then filter and wash the residuum with distilled water until the latter shows no reaction with muriatic acid, <i>i.e.</i> , does not become turbid or milky; then take	

Ammonia	2-4 cc.m.
Water	20 cc.m.

and pour repeatedly over the precipitate in the filter until thoroughly dissolved. The solution thus obtained is diluted with 200-300 cc.m. water, in which the plates may be soaked sixty seconds. Before immersing the plate it is well to place in a bath of water, to which a few drops of ammonia have been added.

Before closing this paper, the writer wishes to add a word of caution to photographers who wish to prepare their own color-sensitive plates. Do not attempt it in extremely hot weather, as the gelatine on the plate is apt to soften and run, thus ruining the plates.

JULIUS F. SACHSE.

SUCCESS IN PORTRAITS—FURTHER HINTS.

IN the previous number of this journal I gave some general advice about the artistic management of heads in photographic portraiture, and it has occurred to me, since writing what I did upon the subject, that some further help might be offered in regard to what may be the best mode of procedure in the manipulatory details.

It will, of course, be taken as granted that only dry-plate work is referred to, as there is, probably, very little wet-plate work done now, either by professionals or amateurs. In the first place, I hold it of the utmost importance that extremely rapid plates should be used. I know that many workers feel timid about using extremely sensitive plates, but I have never fully understood why such feeling should exist. With proper care about excluding actinic light from the dark room, and cleanliness in the manipulation, a good make of the most sensitive dry plates will invariably yield good results,—in my own experience, better than can be got by the use of plates of less sensitiveness. Beginners generally set great value upon extreme density and contrast in their negatives, which is a mistaken idea. They will find, when they have gained more experience, that what they at first thought rather feeble work will in the end prove the most desirable; and as what is technically called thinness is one of the prevailing objections to rapid plates, this at least should not stand in the way of their use.

In portrait work it is especially desirable that the time of exposure of the plate should be as brief as possible. The majority of people, when they are sitting for their likenesses, cannot divest themselves of the consciousness of the situation, and in their efforts to preserve a calm equanimity they attain a diversity of expression that is frequently destructive of a happy likeness. In the effort to overcome the disadvantages of a long sitting, we frequently see the sitter posed in entirely too strong a light, either placed very close to a window in an apartment, or subjected to the glare of a "sky-light," and, strange as it may seem, such strong, unsubdued treatment can never result in anything but a harsh, unrefined work. In order, therefore, that we may attain a desirable softness of the contrasts of the lights and shadows, and an undrawn look of the sitter, it is necessary that our light should be considerably diffused and softened before it strikes the head and face. I must here say that it is for this reason that I set so much stress upon a high light in my previous article. It will be obvious that if we increase the height of the light in an apartment we must increase the distance of the sitter from it, in order that it may fall at a proper angle upon him, to make a good picture, and consequently it will be very much more softened than if he were seated close to a low light, and, of course, as we soften our light we subdue it, and a longer exposure is rendered necessary; and if we use the most rapid plates that we can get, we gain the great advantage of posing our sitter in a quiet, subdued light, where the eyes may be calmly opened, breadth and softness attained, and at the same time not protract our sitting over the time that would be necessary with a slower plate in a harsh light.

At this point it will not be out of place to make some reference to the use of the head-rest, an invariable accessory of the sky-light, and an implement held in awe as almost analogous to the head-rest of a dentist's chair by many nervous people, but I must say an indispensable for continuous good portrait work. Much as has been and is said against this very useful contrivance, I would advise its use generally. Occasionally it may happen that a very successful picture is taken without one, but this is too much a matter of chance to be relied upon for constant practice. The beauty of a photograph is so much enhanced by a considerable amount of sharpness, that in addition to very careful focussing the steadyng of the head is of great importance. It is not only as a safeguard against sidewise swaying motion that the rest is of advantage, but the sitter may, without being aware of it, move a little nearer to or further away from the camera during the interval between focussing and making the exposure, which throws the whole out of focus, and makes a blurred and unsuccessful picture. And furthermore, we often curtail an exposure, fearing a movement of the sitter, when we would have allowed more time and made better work had the head been steadied properly. In using a head-rest, however, let me enjoin that it be adjusted to the head,—not the head to the rest. Arrange the pose, lighting, and all with due care first, then at the last moment bring forward the rest, properly adjusted, and simply steady the head with it.

All those who are sufficiently interested in the art to care to do careful work will before long find themselves using a developer of their own, a modification of some of the standard ones given, and they will also attach themselves to a brand of plates which will insure them best success. It is proper that this should be so, because by constant flitting from one to another of the many plates and developers offered,

that certainty of procedure and of results to be obtained can never be arrived at which is to bring forth work of the highest excellence.

Do not be carried away by the idea that rapid plates are only for snap-shutter work. In taking portraits with them count your time of exposure by seconds, and not by portions of seconds. An under-exposed plate is absolutely worthless, while a rather fully exposed one is easily restrained in development, and a fine picture may sometimes be got by after-intensification when the plate is too thin from over-exposure. Try to have your developer as nearly as possible of the proper strength, but if you can, let it be on the side of being too weak rather than too strong. Proceed slowly, and do not cut the development short, the only clear places, if there are any, should be in the points of most intense shadow.

It should be the emulation of all who feel a true interest in photography to produce some fine heads. A truly fine photographic portrait is indeed an admirable thing to look upon. The human countenance, constituted as it is of a number of features, is a remarkable work of nature. The eyes, nose, and mouth, the principal ones, contain such a variety of outlines and modeling that each is in itself a study. Whenever we go in the least out the usual and commonplace, and enter upon the realms of the beautiful, the intellectual and the picturesque, we have in a fine portrait, to persons of cultivation, and to artists especially, a picture worthy of interesting study, and more or less of admiration. To the masses a portrait, except as a likeness of some one, has no more interest than the card that it is mounted upon. But let anyone have spent a little time in attempting to draw and paint faces,—see with what a different eye he will observe any good photographic head placed before him. He will begin at once to analyze it,—the general shape of the head, the relative proportion of the features to one another, the expression, and the infinite variation of delicate lights and shadows which constitute its surface modeling, will all be carefully observed. What delight he will find in the curves and flowing lines of the hair, the brilliant life-like look of the eyes, the drawing and modeling of the nose, and the various inflections of the mouth. But what do we get of all this in a common, everyday photograph? Little or nothing, we are sorry to say. For the sitter has been placed in a raking, strong top-to-bottom light, falling chiefly upon the edge of the face. Little attention has been paid to securing, by careful exposure and development, the exquisite half-tones which constitute the perfection of the art, and all deficiencies have been sought to be atoned for by an abundant amount of indiscriminate retouching, which has robbed the face of those touchings and marking of character which nature has placed there as belonging to her book of truth.

Let it not be supposed that I would have matters changed as they exist. The work that is turned out from the galleries is precisely what is wanted. It suits the customer, and he is the one who pays for it. My exhortation in behalf of excellence is only for the few who may appreciate a fine work of art, and whom we would put on the road for producing, when opportunity may offer, something that will be of high and lasting credit to the art of photography.

XANTHUS SMITH.

LENS CLEANING.—Pure spirits of wine, applied with cotton wool and wiped off with a fine chamois leather, is the best thing for cleaning lenses.

PERMANENT HISTORICAL PHOTOGRAPHS.

BY one of those strange metaphysical coincidences with which we occasionally meet in the literary world, our valued contemporary, the *Photographic News*, of London, No. 1664, published simultaneously with ourselves (August, 1890) a leader looking towards solving the problem of preserving permanently historical photographs. The method proposed by our English contemporary is to secure a transparency between the sheets of glass by means of Canada balsam. We regret to say, we fear the process suggested will not fill the requirements of permanency, judging from our experience of ambrotypes of old and lantern slides, which were so prepared. However, we reproduce the paper for the benefit of our readers, and trust that the subject may continue to attract the attention of the photographic world, until a satisfactory solution is arrived at, both regarding an absolute permanent negative and print, as well as means of preserving them for comparison and study.

The production of small photographs for historical purposes, in such a manner that they are likely to resist the attacks of deteriorating influences for centuries, is a problem which well deserves the attention of the photographic world. Many years ago we gave a considerable amount of attention to the problem, and came to the conclusion that one good method was to cement with heat a collodion transparency between two plates of glass, by means of a resinous substance not likely to crack or otherwise deteriorate with lapse of time. In short, the idea was to preserve the photographic film like a fly in amber, and between two sheets of glass.

The insects found in amber lived ages ago, and most of them belong to now extinct species.

In those early times many an unfortunate insect, while crawling upon a hot day, beneath the shade of certain pine trees, particularly the *Pinites succinifer*, found itself entombed forever in a mass of resin, which had fallen from above as an exudation from the tree. The essential oil in the resin slowly evaporated in course of time, the resin itself hardened correspondingly, and the body of the insect became so protected from the ravages of time, as to be preserved through geological periods.

On this principle we once set to work to make a kind of artificial amber, so far as properties were concerned, that is to say, a transparent, resinous cement, free from volatile oil. A sample of pure and old Canada balsam was taken, and placed for several days in an oven with the door open, to slowly drive off the essential oil without the application of much heat; it was stirred occasionally during the operation. Afterwards a few drops of castor oil were added to the melted balsam, and well stirred in; care was taken not to add too much castor oil, otherwise the mixture would not have become sufficiently hard when cold.

When the proportions—which must be discovered by the system of trial and error—are nicely adjusted, the mixture, when cold, is somewhat tough, and not so brittle as amber.

Castor oil is not a volatile oil, and may almost be classed with the drying oils, for after the lapse of great length of time a thin layer of it will dry into a film.

The mixture just described is virtually a tough resin, practically free from volatile matter.

A plate of iron, with short, firm legs, and some minute gas jets a little below it, was then taken, and some sheets of smooth blotting-paper laid thereon, so that the transparency should not come into direct contact with the hot iron.

The heat was regulated by means of small taps governing the gas flames; too much heat discolored the resinous mixture, and gave the transparencies a yellow tinge. The transparency was laid face upward on the blotting-paper, and when it became sufficiently hot some of the melted prepared balsam was dropped upon it; the warm covering glass was then laid upon the balsam, and the excess of the latter worked out at the edges of the two plates by means of thickly gloved fingers. Air bubbles were troublesome, but with patience could be worked out; this was all the more practicable because plates larger than the lantern slide size were not employed. Uneven glass was troublesome and sometimes useless for the purpose; patent plate or other glass, with a truly plane surface, should alone be used.

The hot-iron arrangement was not a good one for working always at uniform temperature, or for yielding a steady heat. A better plan would be to use a brazed rectangular vessel of copper, filled with olive oil and with gas jets beneath; a thermometer with its stem projecting from the oil bath would serve as a guide to the temperature, and the manipulations should be performed on the upper copper surface of the bath.

The operations already described were performed by us about a quarter of a century ago, in the old collodion days, and the various portraits, heads, and busts only thus preserved were altogether unchanged, so far as memory could be trusted, when we saw them last, upon turning out the contents of an old box a year or two back.

One of the portraits thus preserved was that of Faraday, and it is probably the most life-like and interesting one of him at present in existence; another was a likeness, and not a flattering one, of Professor Tyndall. The two collodion transparencies were originally obtained from two professional photographers, who furnished them to us at the request of Professor Tyndall.

When Mr. York photographed the last of the quaggas, little did he think that he was earning immortality for his name, and causing it to be emblazoned forever in the annals of zoological science, just as would have been the case with another man had that other person been the only one to photograph the last living dodo. Mr. York has five negatives of the quagga, and it is desirable that positives from them should be made as soon and as perfectly as possible, by the most permanent process available, and one yielding abundance of delicate detail. On considering these points, it will be seen that much is to be said in favor of the method just described, and that it is one which deserves the attention of the historian and the antiquarian.

Some microscopic slides cemented with Canada balsam are found to lose their covering glasses by the balsam hardening and allowing the glasses to chip off.

The process of cementing lenses, photographs, and so on by means of Canada balsam and castor oil is as old as the hills, and we are told that the ready-prepared transparent cement can be had in the market. For historical purposes, however, it is essential that the photographer shall conscientiously make the cement himself at the lowest suitable temperature from the best materials, and shall take care that all the volatile oil has been driven off; he must also take care that enough castor oil is employed to guard against an adverse amount of brittleness. The arborescent markings which sometimes appear between cemented lenses are due to a residuum of volatile oil in the cement used, which oil evaporates in course of time after the cementing.—*Photographic (London) News*.

PHOTOGRAPHY IN COLORS.

CAPTAIN ABNEY thinks there is no scientific basis for belief in the ultimate success of the silver-chloride process of photography in colors, and there appears to be a growing belief that all apparent progress along that line is a delusion. Coincident with the growth of this belief there is a manifest increase of interest in attempts to solve the problem by a composite process. Mr. Ives, of this city, who is recognized as one of the most scientific experimentalists in this line, has just been granted a patent for the method which he proposed about two years ago. It will be seen by the following extracts from his patent specification that he makes a set of negatives which, by their light and shade, represent the effect of the objects on the primary color sensations. The patent office held that this amounted to the application of a new and original principle, and granted Mr. Ives exclusive right to make and use such sets of negatives. By first making such negatives, and then making composite color-prints from them with transparent colors suitably representing the primary color sensations, Mr. Ives expects to accurately reproduce the colors of nature. Such a plan is essentially different from that of the photo-chromic or chromo-collotype processes, in which a single negative only is required, and the combination of colors is regulated by an artist, as in chromo-lithography.

The Bierstadt process, mentioned in our last issue, and of which no specimen has as yet been forthcoming through the channel then mentioned, appears to be a compromise between these two plans,—a process of composite heliochromy, professedly based upon what is known to be a false theory of colors, and its imperfections toned down by the use of a key-plate printed in neutral color. It is quite possible, however, that Mr. Bierstadt has taken advantage of Mr. Ives' publication of his new principle, and does not actually work in accordance with the theory of color which he professes to believe in.

IVES' PATENT SPECIFICATION (EXTRACT).

" My invention consists, first, in a method of producing a set of photographs of an object or landscape which can be subsequently used for the production of a heliochromic picture; and, second, in a method of producing a heliochromic picture upon a screen by means of the said photographs, although they are also adapted to be used in the production of heliochromic pictures by means of pigments.

" In order that my invention may be understood, it is necessary to explain the modern theory which distinguishes between primary spectrum colors and primary color sensations. According to this theory, which is fully stated in recent text-books on color, there are three primary color sensations,—red, green, and blue,—and only certain narrow and widely-separated portions of the spectrum are capable of producing these strictly primary color sensations. All other parts of the spectrum excite two primary sensations simultaneously, in varying degrees of proportions, and produce compound color sensations, as of orange, yellow, yellow-green, and blue-green. In short, the visible spectrum does not consist of three, or seven, or other limited number of primary colors and mixtures thereof, as taught in older text-books, but of thousands of different primary rays, each of which excites one or more of the three primary color sensations in definite degrees or proportions.

" My plan, based upon the above theory, may be described as follows : Three photographs are to be made from each subject to be reproduced in such a manner that each photograph represents by its light and shade the degree to which light coming from different portions of the subject excites a single primary color sensation in the eye. These three photographs are then to be projected simultaneously upon a screen, each by light which excites only the primary color sensation which it represents, and in such a manner that the three colored images are exactly superimposed and combined to appear as one picture, which should produce exactly the appearance of the object photographed, both as to light, and shade, and color. This involves, first, the production of one photograph by the joint action of the red, orange, yellow, and yellow-green spectrum-rays, but chiefly by the orange, to represent the effect upon the red sensation ; another by the joint action of the orange, yellow, yellow-green green, and green-blue rays, but chiefly by the greenish-yellow rays, to represent the effect upon the green sensation ; another by the joint action of the blue-green, blue, and violet rays, but chiefly by the blue rays, to represent the effect upon the blue sensation ; and, second, the projection of the first photograph by pure red light, the second by pure green light, and the third by blue-violet light. It may be conveniently carried out in practice in the following manner : A negative representing the effect of the illuminated object upon the primary red sensation may be made by exposing in the camera a gelatine bromide-of-silver sensitive plate treated with the dye known as "cyanine," and through a light-filter consisting of a collodion film colored to a sufficient depth with aniline-yellow and chrysoidine-orange. The character of the sensitive plates and shade of the light-filter should be tested by photographing the solar spectrum, the photograph of which should show an intensity-curve substantially like the curve of a diagram representing the relative power of spectrum rays to excite the primary red sensation.

" A negative representing the effect of the illuminated object upon the primary green sensation may be made by exposing in the camera a gelatine bromide-of-silver sensitive plate which has been treated with a mixture of the dyes eosine or erythrosine and cyanine, and through a yellow light-filter of suitable intensity. The sensitive plates and light-filter for this purpose should also be proved by photographing the spectrum, the negative of which show an intensity-curve substantially like the curve of a diagram representing the relative power of spectrum-rays to excite the primary green sensation.

" A negative representing the effect of the illuminated object upon the primary blue sensation may be made by exposing an ordinary gelatine bromide-of-silver sensitive plate through a double screen of chrysophenine-yellow and aniline-violet in such proportion as will secure in photographs of the solar spectrum intensity-curves substantially like the curve of a diagram representing the relative power of spectrum-rays to excite the primary blue sensation. By the introduction of minute quantities of other dyes in making the light-filters the intensity-curves may be slightly modified to more exactly accord with the diagrams representing the action of the spectrum upon the primary color sensations.

" Claim No. 5. A set of three photographs for the production of composite heliochromy, one produced by the joint action upon a sensitive plate of red, orange, yellow, and yellow-green spectrum-rays, but chiefly by the orange, and least of all

by the deep red and the yellow-green ; another by the joint action of orange, yellow, yellow-green, green, and green-blue, but chiefly by the yellow-green, and least of all by the orange and the green-blue ; and another by the joint action of blue-green, blue and violet, but chiefly by the blue, the spectrum-rays having been made to act upon the plate with an intensity corresponding to their power to excite the primary color sensation which the respective picture is designed to represent." J. F. S.

ASTRONOMICAL PHOTOGRAPHY.

THE strides which have of late been made in astronomical photography were brought into strong relief by a paper which was read at the last meeting of the Astronomical Society of the Pacific, in the hall of the California Academy of Science, San Francisco, by Mr. Barnard, who explained how he had made photographs of the Milky Way, the Andromeda Nebula, etc., with a large portrait lens of 6-inch₁ aperture and 31-inch focus. This was strapped on the tube of the 6½-inch equatoria of the Lick Observatory, the clockwork of that instrument being controlled by hand with the slow motion rods at the eye-end. A star was kept bisected by the cross-wires in a high-power eye-piece on the 6½-inch itself. The additional weight of the camera made it necessary to constantly correct the clock throughout the exposures. With this instrument a negative of the Pleiades was made on August 23 last, an exposure of 1h. 15m. being given. This showed the Merope Nebula conspicuously, the sharp prong of nebulosity from Electra, and some of the nebulosity about Maia and Alcyone. A negative of the Milky Way (17h. 57m. 18.9 deg.) was made on July 28, with an exposure of 2h. 35m., and another on the Milky Way (17h. 56m. 28 deg.) on August 1, with an exposure of 3h. 7m., and a negative of the Great Nebula of Andromeda on August 26, with 4h. 18m. exposure.

The paper was illustrated by lantern slides from these plates. These were projected on the large screen by the oxy-hydrogen light. The nebulosities of the Pleiades were very conspicuous to the audience, and the beautiful-cloud forms of the Milky Way, with the myriads of stars into which they were partially resolved, were exquisitely shown. The slide of the Great Nebula of Andromeda, when first projected on the screen, had a mask over it with a small hole representing (to scale) the field of the great telescope on Mount Hamilton ; this was moved about over the slide showing successive fields of view over and around the Great Nebula. Only a small portion of the nebula could be seen at once ; the mask was then suddenly removed, and the entire nebula, suspended amid countless stars, flashed into view. The contrast between the limited space representing the field of the great telescope, and the sky as shown by the photographic lens, was startling in the extreme. This slide showed the great nebulous rings that were first proved to exist by Roberts. Mr. Barnard has estimated, by carefully counting areas, that the original negative of the Andromeda Nebula—8 by 10 inch—contains 64,000 stars that can be distinctly counted. This entire plate had been reduced to a lantern slide, which brought out peculiarities of arrangement in the stars that were not suspected in the original negative. In all of these photographs the stars were perfectly round.

We may here remind our readers that De La Rue, Huggins, and Vogel in the Old World, Bond, Rutherford, and Draper in the New World, by a gradual process of experimental work, succeeded in obtaining photographic images of stars and nebulae, and even of the spectra of these bodies. Their success increased as the plates improved, and to-day their worthy successors—for many of these honored names have passed into history—can exhibit photographs of the nebulae which show every detail visible to the eye, and bring out beautiful characteristics which the eye alone might never have discovered. Star maps are now generally to be made by photography. This work was suggested by Rutherford; it was first shown to be feasible by Professor David Gill, Her Majesty's Astronomer at the Cape of Good Hope, when he exhibited to the admiring members of the Royal Astronomical Society his photograph of the great Southern comet of 1882, which he obtained by an ordinary portrait lens with long exposure. This was not by any means the first comet photograph which had ever been made. After many previous experiments by others, Mr. Common had finally obtained a negative of "Comet b, 1881," a beautiful comet, still fresh in the memories of many of you, no doubt. And it was not so much the success of Mr. Gill's magnificent comet picture which awakened the astronomical workers to the importance of photographic methods, but the number and sharpness of the *star impressions* recorded on the plate. Throughout the tail, showing through that appendage apparently undimmed and scattered all over the place with extraordinary distinctness, were hundreds of stars, from the brightest in that particular field of view down to the lesser magnitudes entirely invisible to the naked eye. To many experienced photographers in the astronomical line, this picture came "as a revelation," as one of the foremost among them remarked. The importance of Dr. Gill's achievement was immediately perceived; it produced a revolution in at least one branch of observatory work, and on this hinges a curious bit of history.

That assiduous observer, Chacornac, many years ago, while astronomer at the National Observatory, at Paris, started in to make a complete set of "Ecliptic charts," for use in discovering minor plants, etc. The Ecliptic, it need hardly be explained, is that path around the heavens in which the sun, moon, and planets appear to describe their motions; and even the little planets or asteroids, with the most eccentric orbits, are bound to cross that line at some time during their revolutions. A minute chart of this region was then a great desideratum. A proof of its value is found in the list of discoveries made by Chacornac while executing the work. For a score of years the French Astronomer labored at his self-imposed task, and at his death, early in the last decade, had finished but 36 out of the 72 Zodiaca charts projected. The brothers Henry (Paul and Prosper), of the same observatory, two most admirable men, and devoted workers, attempted to finish Chacornac's undertaking. They succeeded in completing ten of the remaining 36, but at this point reached that portion of the Ecliptic occupied by the sun in mid-winter—in the constellation "Sagittarius," where the Zodiac crosses the Milky Way.

The Henry brothers had heard of Dr. Gill's photograph showing the multitude of stars, and in it discovered the solution of the difficulty. They would turn their telescope into a camera, and let the stars map themselves! They use a twin telescope, consisting of a 13in. photographic and a 9in. usual glass, mounted for a single equatorial.

For the work which is to be accomplished in pursuance of the decision of the Paris Congress of 1887 is to be done by the different observatories co-operating with telescopes of this type. The 10,000 or 11,000 photographic charts estimated as necessary to cover the entire sky will probably be completed in five or six years. The star chart congress will assemble again the coming month at Paris, and it will be supplemented by a general meeting of astronomical photographers, for the discussion and co-ordination of work in this grand field. The whole subject is so comparatively new that we may confidently expect even greater advances in the future. As it is, since the plan of operations (with a 13in. telescope of 15ft. focal length) was adopted by the congress, a new scheme, involving a complete set of charts by a single telescope (a photographic doublet of 24in. aperture) has been set on foot by Professor Pickering, the director of Harvard College University, the funds being provided by a wealthy New York lady, Miss Bruce. This projected camera, having a focal length of only 11 feet, will give plates each covering an area in the sky equal to five degrees square. With such a camera on a high mountain in the southern part of California, favored by clear, transparent skies, Professor Pickering expects to complete the entire series of charts alone in two or three seasons. We may also mention that the Harvard astronomers have made a specialty—spectrum photography. A prism in front of the telescope is used to disperse the light of the stars in view before passing through the object-glass—each star shown then gives a spectral image instead of a point. The spectrum of every star in a cluster like the Pleiades may be photographed on a single plate, and individual peculiarities studied. A distant unknown planet would possibly be recognized by the difference in its spectrum, since a star shines by its own light, and each planet in our system simply reflects the light of the sun. Any major planet in our system still unknown would doubtless be of exceeding faintness—probably smaller than the 10th magnitude—its motion among the stars would be remarkably slow and difficult to detect, and if such a planet really exists, it may, in the course of years, be discovered by means of photography. Here, then, there is a splendid field of scientific discovery opened for photography.—*Invention.*

ONE of the new things in the home of a young woman with artistic ambitions is a photographic screen as tall as herself. It stands in three folds, and inserted irregularly in each fold are cabinet and imperial photographs of her best-looking friends. The frame-work of the screen is old oak, and the folds are silk. One of the folds is salmon in color, the second is light blue, and the third copper brown. Upon these colors for a background, the black and white of the photographs stand out with striking effect.

OPERATOR (to fair lady sitter)—“Now, Miss, sit quiet for a moment; but you can wink as much as you like.”

Fair Lady Sitter—“Why, does the camera understand winks?”

Operator—“Certainly, and if you wink too much it will reply in the negative.”

And it was so quiet that one could hear the plates develop in the dark-room.—*Exchange.*

AMATEUR EXPERIENCES, VI.—“THE HOTEL WITH A DARK ROOM.”

Editor AMERICAN JOURNAL OF PHOTOGRAPHY:

AGAIN I must complain, and pour a tale of woe in your patient ear. Last week I concluded to take a little trip, a photographic one, camera, tripod and all. The objective point was one of the numerous romantic glens in old Chester County, where primitive nature still holds her sway, and the sparkling rivulet falls over rock and ledge as it rushes between the rugged boulders in seeking its level. Majestic forest trees, interlocking their branches high up in the air, shade the stream from the rays of an August sun, while the feathered songsters carol merrily, and the chirrupy squirrel sports in the cool shade of the foliage, the whole forming an ideal spot for the artist or lover of Nature.

Near this beautiful spot a summer hotel had been erected, and, as an extra inducement for patronage, advertisements were scattered broadcast that a dark room had been provided, and was at the disposal of any amateur photographers who patronized the house. Well, I knew the spot: there were numerous romantic bits, log bridges, large rocks, waterfalls, sun-lit vistas,—all choice food for the camera. I concluded to take it in, especially as there were facilities for changing my plates if necessary. I arrived late in the morning, shook hands with the landlord, registered, and introduced myself to him as the secretary of the Leopardville Camera Club, and had come up on a trip to photograph around the glen. He told me he was glad to see me, but that the house was full; but he would have a room for me by night; so I waited for dinner, and then started out to photograph. Well, when I got down into the glen, or the falls, as the spot is called, I found there were just eighteen of me; male, female, young and old,—a couple of summer girls included,—while the outfits were as varied as the shooters. There were Kodaks, Hawkeyes, Detectives, Student outfits, a Blair, an Eastman and Rochester, and my own 4x5 Waterbury outfit. Was I disgusted? Every way you turned a lens or two was pointed at you, so I pulled up stakes and went further up stream, wandered around, enjoyed nature, filled my lungs with fresh air, and shot off my plates, mentally wondering what luck I would have. Thus the afternoon passed, and the lengthy shadows soon reminded me of the time to return hotelwards.

Well, when I got there fourteen of us were out on the porch before me. After washing up, I also went out on the porch to wait for the melodious gong to roar for supper. Just at that time the rest of us joined the party,—two dreams in white, with their escort, a fellow amateur; he was a member of a college camera club, and wore his uniform, corduroy knee-breeches, grey stockings, silk shirt, with pale blue sash, and cap on which was embroidered the club monogram. Before I could pick up an acquaintance with the trio the gong roared, and we all went in to take a shot at supper. After that was over I asked for my room, and being shown up was told the dark room adjoined, and we were at liberty to use it. After being left alone we started to investigate the hotel dark room so largely advertised. Lo, and behold! it was nothing but a large closet, without light, ventilation, or water; a rickety table, on which was a tin candlestick and tallow candle, and a bucket on the floor, completed the outfit of the hotel dark room. So far so good, we changed our plates,

and being tired, thought seriously of turning in. There was a tap at the door; on the reply to come in the door opened, and there stood one of the amateur photographers. It was a woman amateur, one of the strong-minded kind; I afterwards found out that she was a country school teacher of the unclassified kind (I mean the school). She was of masculine physique, and wore a determined expression which brooked no contradiction. Well, there she stood, with plate box in one hand, an amateur developing outfit under the other arm, and her ruby lamp swinging from her thumb. I looked in dismay. She said sharply: "I want the use of the dark room to develop my plates; you may go down on the porch until I am through." I ventured to say I was about to retire for the night. "Can't help it, sir; you are detaining me." With this I glanced at her face; well, I thought perhaps I had better go down and sit on the porch for a while. After about an hour I ventured up. The lady had finished. I congratulated myself upon a night's rest, but as the fumes of the lamp and chemicals had filled my room, I opened door and windows to ventilate. Hardly had I sat down when a footstep sounded in the corridor; it came nearer and walked in; it was another amateur photographer. It was a "he" one this time. I sized him up as soon as I saw him. He made a streak for the dark room. He was a spare, middle aged man, of the decided crank species. He had all of his traps with him. It was one of the kind advertised in the country weeklies for \$10.00 complete,—camera, lens, tripod, chemicals, etc., including developing, printing, and toning outfit, and a book how to make photographs, and instructions how any one without any previous knowledge can make twenty-five dollars per day with the outfit. The old fellow told me that this was his first experience, and he had an idea that he could develop the plate by electricity; so he had brought a medico-galvanic battery along to experiment with, if it took him all night. After he got through talking, I told him he was all out in his idea, and I wanted to go to sleep; then he got cross, and said he wanted his rights; if it hadn't been for the dark room he wouldn't have come here. I told him he had better wait until daylight with his experiment, as the light from his ruby paper lamp might have some effect upon his galvanic current; but he would not listen to reason, I wanted to go to sleep, and he wanted to develop, he threatened to call the hotel-keeper. While the confab was going on four more of us were in the hall waiting to use the dark room, so I went down and laid on a settee in the close stuffy sitting-room, for the rest of the night. With the first dawn of day I was out in the fresh air, with joints stiff and muscles cramped. After an early breakfast I paid my bill (including fifty cents for use of dark room), and headed for nearest railway station, camera, tripod and outfit, a disgusted amateur, who will henceforth avoid country hotels where dark rooms are provided for amateur photographers.

J. FOCUS SNAPPSCHEOTTE.

A CHARACTERISTIC sign of the times, which shows the growing importance of photography, is the circumstance that all the great daily newspapers, in both the old and new world, are forced to give recognition to this especial branch of art. This is the result of the general interest which has been awakened in photography. One of the latest papers to recognize this fact, and to comply with the demand of the public, is the *Figaro*, of Paris, and it now devotes a column every Tuesday, *o'soleil*, to photographic topics and information.

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AMERICAN JOURNAL OF PHOTOGRAPHY.



ENTOMOLOGICAL PHOTOGRAPHY.

CITHERONIA REGALIS ("HICKORY HORNED DEVIL").

NATURAL SIZE; FROM LIFE.
NEGATIVE BY J. F. BACHE, AUGUST 9, 1890.

IVES PROCESSES.—CROSBCUP & WEST ENGRAVING CO.,
911 PILBERT STREET, PHILADELPHIA.



ENTOMOLOGICAL PHOTOGRAPHY.

CITHERONIA REGALIS ("ROYAL HICKORY MOTH").

THREE-FOURTHS NATURAL SIZE.
IVEB PROCESS.—CROSCUP & WEST ENGRAVING CO.,
NEGATIVE BY J. F. SACHEL,
811 FILBERT STREET, PHILADELPHIA.

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ENTOMOLOGICAL PHOTOGRAPHY.

AS a further illustration of the manifold uses of the camera, in connection with the sensitive dry plate of the present day, in the field of biology and the natural sciences, we present to our readers a picture of a rare and curious entomological subject, showing what can be done even with so generally despised an object as the larva of the Lepidopterous insects. It is here where the great value of entomological photography shows itself. Every entomologist recognizes the great difficulty experienced in attempting to preserve specimens of the larva of the various moths and butterflies, as from the peculiar construction of the tissues of the subject, it is next to impossible to preserve the insect with anything like a natural appearance. Even under the most favorable circumstances the prepared specimens lose their color, and soon shrivel and become valueless for study and comparison. Heretofore drawings have been made of the larva, a proceeding always expensive, and often unsatisfactory. It is here where photography asserts its superiority, and with proper appliances and competent operators, results may be obtained showing characteristics not to be obtained by any other means. For example, we will take our illustration : it would be an easy matter to stop out the negative, print on heavy, plain paper, and then lightly tint with proper shades in water colors. When we take into consideration the large field open to the students when they follow the study up with the moths and butterflies, there really seems no end to the possibilities for interesting and scientific study.

To return to our subject. Technically, the specimen is known as the *Citheronia regalis*. In the South, where it is more common, it is known among the blacks as the "Hickory-horned Devil." It is difficult to find a more repulsive-looking animal, or one which has more the appearance of our ideas of an antediluvian monster. Nor is it any wonder that the naturally superstitious blacks of the South should fear the insect, as they are taught from childhood that its bite is more deadly than the rattlesnake or moccasin, or that even to meet one of the worms is an evil omen, and forebodes bad luck.

In our latitude, 42d parallel, the worm is exceedingly rare, being seldom met with. The specimen photographed was found August 7, crawling on the Lancaster turnpike, within the bounds of the village of Berwyn. While in motion, it was fully six inches long. To photograph it, a piece of white paper was laid on a gate-post, and the worm laid on the paper. Three negatives were obtained. The one here reproduced shows the worm in its natural size, with contracted segments. The color is a greenish-grey; the body-spines glossy black; the six horns growing out of the head are hard and bony, of a deep orange-red, as are also the two front tusks; the six front legs are a dirty red color, and are here drawn into the body; the eight oval spots on the side are the breathing orifices of the animal; the lower jaw, between the forelegs and tusks, is of a dirty yellow ochre. The subject was exceedingly nervous, and quick in its movements. When startled or angry, the animal raises up its head, throwing back its horns, and elevating the tusks, while the six forward legs are thrown forward, probably a full half an inch. A fairly good negative was obtained of the worm in this position. The third negative shows the erect head slightly enlarged.

The moth or butterfly of this worm is known as the "Regal Hickory Moth," mea-

suring about seven inches with outspread wings, and is exceedingly short-lived, neither male or female showing any sign of digestive organs. The moth emerges forth from the ground, same as the cicada, some time in June, and its whole mission seems to be the reproduction of its species. For this purpose they are endowed with an unknown sense, or peculiar power, said to lay in their antennæ, by which the male, though miles away, is attracted to the female. An experiment was made to prove this; a female moth was caught and taken to the city, and at night was placed near a window,—the next morning two male moths were found and captured. The female lays her eggs on a hickory or black walnut tree, on which the larva feeds as soon as hatched, which usually takes place within a few days, both of the moths dying soon after their function is fulfilled. The young worm grows rapidly, and at the age of six weeks attains the size of our specimen, and is then ready to burrow himself into the ground, and relapse into a state of chrysalis. After the worm has encased himself in the ground he sheds his skin, and draws his segiments up, and envelopes itself in a peculiar chitinous substance, having the appearance of a piece of ordinary black licorice, about two inches long. Thus it remains in a dormant state until the following summer, when the moth issues forth, expands itself, and the same process is repeated.

Through the courtesy of Dr. Henry Skinner, curator of the Entomological Section of the Philadelphia Academy of Natural Sciences, we are able to present a picture of the moth.

J. F. SACHSE.

HINTS ON PHOTOGRAPHIC PORTRAITURE.

THE photographic portrait has become so popular that there are very few individuals who have not at some time or another submitted to the rather unpleasant process of "sitting" for it, and most people have in their homes considerable numbers of this product of modern "art." But though the quantity is great the quality is poor, and a good portrait, which is at the same a good picture, is an exceedingly rare bird indeed. The chief causes of this are hurry and want of consideration in the matter of posing and the arrangement of accessories on the part of the photographer; and ignorance, obstinancy, bad taste, or nervousness on the part of the sitter.

Every sitter ought to be a subject of study to the operator, who, in the case of strangers, should talk a little to his subject before posing, so as to gain some insight into his individuality, and place him (or her) at ease, so that a constrained attitude and unnatural expression may be avoided. The mere anatomical lines of face and figure do not so much mark the individuality of each person as his habitual postures, habits of holding the head, hands, etc., and tricks of expression; but these are very apt to disappear in the photograph, owing to the want of skill of the operator, or frequently to self-consciousness on the part of the sitter, who will often try to adopt a mien quite foreign to his nature. "Be natural" is a piece of advice which should be impressed on all sitters. People with merry round faces make themselves ridiculous in the attempt to assume a determined or tragic air, while those whose features are naturally classic and stern endeavor to soften their expression by calling up an idiotic simper. Most people wish to appear what they are not. A learned lady in spectacles will in-

sist on being "taken" with a playful fan, in a wild attempt to ogle the camera; a bright young girl will try to look the victim of blighted affection; a man who has never been astride of a horse will sport top boots and breeches, and carry a riding whip; while a gentleman *de sang pur* looks like his own groom. To avoid affectation is most important if one wants a good portrait, and in the matter of expression the best thing is not to think how one is looking, but to follow out some pleasant train of thought which will naturally call up a pleasing expression; an expression summoned up "for this occasion only" is always objectionable.

If there is any blemish or deformity about the person the operator's attention should be directed to it, so that it may be concealed if possible. For instance, the nose is very frequently not quite straight, and in such cases a full-faced portrait accentuates the defect, while one side of the face will be better looking than the other, and should therefore be the side to appear.

An ugly hand or deformed finger appearing prominently will spoil an otherwise excellent picture, and a beautiful hand, if carelessly advanced too near the camera, becomes large, out of all proportion. The manner in which the hands are neglected in posing is a matter which calls for reform, since the hands are quite as characteristic of their owners as is the face, so much so that when criminals are photographed for purposes of identification the hands are always represented as changing less and being less easily disguised than the face.

Obstinacy on the part of the sitter in the matter of pose often leads to failure. People generally think they can pose themselves better than the artist can pose them, though few are able to do so. There are one or two chief points, however, which it is well to remember, and the first is that whatever part is nearest to the camera appears largest in proportion to the rest of the picture. Hence, a corpulent person sitting facing the camera with the head tilted rather back, comes to look like a barrel surmounted by a cocoa-nut. Short people should be taken standing, and nothing should be placed in the foreground which can dwarf the figure; while, if placed behind an object such as the usual balustrade, will give height. Stout people are best vignetted, and full-length figures seldom look well, unless in the case of children or ladies with long trained gowns. Faces with strongly-marked features are often unrecognisable when taken "full," in which those with unpronounced features, and especially children, alone look well. The "three-quarter face" is the most generally becoming, and should always be adopted in the case of thin people. When one side of the face is handsomer than the other the hair should be dressed to suit it, and it may be given almost in profile, which position is also indicated when there is a very handsome nose. When the forehead and circumference of the head is large it should be tilted slightly back to prevent exaggeration. If the sitter has ugly hands, dark gloves should be worn, with an out-door or evening dress, so that they may not look incongruous. A full, round figure is best shown in profile with one arm raised, as in catching at a bough, or holding back a curtain. To show off beautiful hair a dressing-gown may be worn, and an effective picture made by brushing it before a mirror. Ball-dress is most becoming when the neck and arms are beautiful, and people with short, thick necks should always expose the throat, discarding high collars, lace wraps, velvet bands, bead ornaments, necklaces, and the like. The bead trimmings now so much worn come out very badly in photographs, since the light is violently reflected from the surfaces of the beads. Fussy trimmings round the throat suit those who have long, thin

necks nicely, and velvet or fur next the skin is always becoming. A dark, thick material next the skin, however, affords too violent a contrast, and should be softened by an edge of lace, black lace showing the skin through it being effective for this purpose. White lace should never be worn for photographic purposes, as it makes the skin look dark; this is obviated by passing it through coffee-water, or tea. It must be remembered that photography very frequently exaggerates dark shades, while making light shades appear too light. Hence, in dressing for one's photograph, violent contrasts of shades should be avoided. Large patterns of all kinds, such for example as the fashionable plaids, are objectionable as marking the figure out into so many inches, and large dark patterns on a light ground are especially to be tabooed. Stiff lines and irregularities in the cut of dress are objectionable, and long soft folds of clinging materials are the most becoming. A simply made velvet or cashmere gown is the most desirable from a photographic point of view. Bodices and skirts of different colors or shades come out badly, seeming to cut the figure, and make it shorter and broader than it should be. Dead white and linen collars are most unbecoming, and gentlemen should never be photographed in white waistcoats; and if they must wear shirt fronts and collars, it is best that they should be dirty ones. Such patches of white concentrate the light upon themselves, and thus, by attracting attention, throw the head and face in the shade. This is why boating and cricketing dresses or uniforms are more becoming than ordinary male attire. A very good rule is to avoid wearing anything remarkable in the dress, which will take the attention of the beholder away from the central point of interest—the face. While the effect of pure white dresses is to make the skin appear dark, unrelieved black is equally unbecoming, giving it a deadly pallor. The cold colors, such as blue and violet, in photography become almost white, while the warm colors come out too dark, yellow appearing black. Light colors should be worn by children and by pale, thin persons, while stout people and those of dark complexion should wear dark clothes, since the apparent size of the figure is increased by light clothing.

Truth should, of course, always be the aim of portraiture; but truths may be set forth in an unpleasant way, and justice should be tempered with mercy. There is no sin in accentuating the beauties and concealing the defects of each sitter. Thus, by various arrangements of light the stout can be freed from superabundant fat, and the thin be made to appear plump. Thus, while a corpulent subject should be placed in the usual portrait light with strong shadows, so as to reduce the roundness of face and form, the light should fall on the short side of a thin person's face, the broad side being in half-tint, and the lighting be brought from as low a point as is consistent with the retention of delicate modelling. Light eyebrows, which are apt to come out white, should be darkened with a charcoal pencil, and as light blue and grey eyes come out too pale, their appearance is improved by rubbing in a little charcoal around the eyelids. Freckles, being yellow, come out as black specks; but this may be obviated by rubbing the face briskly with a towel immediately before the sitting, so as to make it red all over. If powder is used, one must be careful not to put on too much of it; and a pale pink or cream-colored powder, to match the skin, is better than a white one.

A rough surface next the skin is far more becoming than a smooth one, since it allows the eyes to dwell on the smoothness of the skin. For this reason also the hair should not be greased for some days before having the portrait taken, and it is a good

plan to wash it on the day before with a little soda water, so that it may be fluffy. If the hair is greasy and brushed neat and smooth, by reflecting the light strongly, it draws attention from the face. The hair should not be brushed abruptly back either for ladies or gentlemen, but should be arranged in a negligé way, so as to frame and set off the face.

One should never be photographed when in ill-health or in a bad temper, for it must be remembered that the camera exactly reproduces the expression of the moment, but that the portraits will last for years, and be seen by many whose estimate of one's character may be formed upon them. This is an excellent reason for taking pains that the likeness shall show one to the best advantage, and for being careful that such libellous productions as are so often seen at the present time, and were still more general some years ago, shall not be sown broadcast.
—Ada S. Ballin, in *The Camera*.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.*

THE exhibition of this society for 1890 will be held in the gallery of the Royal Society of Painters in Water Colors, 5a, Pall Mall East, London, S.W.

The exhibition will be inaugurated by a conversazione, open to members and their friends, at 8 p.m., on Saturday evening, the 27th of September.

The exhibition will remain open daily (Sundays excepted), from Monday, the 29th September, until Wednesday, the 12th of November.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence of photographs, and for lantern transparencies and apparatus.

In accordance with rule No. 37 of the society, the under-mentioned gentlemen have been elected by the members to act as judges and have consented to serve:—Capt. Abney, R.E., C.B., D.C.L., F.R.S., Valentine Blanchard, W. England, J. Gale, Henry Moore, A.R.A., H. P. Robinson.

REGULATIONS.

PHOTOGRAPHIC PICTURES.—Each exhibitor will fill up a printed entry form (supplied by the Society). This must be enclosed, with letter of advice, and addressed to the "Secretary, Photographic Society of Great Britain, 5a, Pall Mall East, London, S.W."

At the back of each frame must be written the name and address of the exhibitor, with the title or description of the picture, and the number (if there be more than one) to which it refers in the entry form. Each frame or picture may have the exhibitor's name, and the title of the picture, neatly inscribed, and this only. Pictures in Oxford frames, and pictures previously publicly exhibited within the London Postal District, will not be admitted. With any work sent in, produced by a special process of the exhibitor, information as to particulars should be communicated.

Photographs colored by scientific or mechanical means will be admissible. Photographs colored by hand will not be admitted. Negatives and transparencies will be admitted.

No charge will be made to members of the society for exhibiting their pictures; but to non-members a charge of one shilling per square foot will be made for wall

* Such portions of the circular as relate to photographic apparatus are omitted.—ED.

space, the minimum charge being five shillings. It is requested that postal orders to pay for the wall space required by non-members be enclosed with the entry form; and should any of the pictures sent not be hung, the due proportion of wall space charge will be returned. The charge for wall space to those exhibitors who may become members of the society at the November and December meetings, will be remitted, and the amount paid credited to their entrance fee and subscription.

Foreign exhibitors are specially invited to contribute. The society will pay the carriage of photographs one way, and provide frames during the exhibition for photographs approved by the judges. There will be no charge for wall space.

Exhibits sent in packing-cases (carriage paid) must be addressed to the "Photographic Society of Great Britain, care of Mr. James Bourlet, 17 Nassau Street, Middlesex Hospital, London. Packing-cases must arrive not later than Monday, September 15th: they will be too late if received after that date. No packing-cases can be received at the gallery.

Lantern transparencies sent in competition for a medal, not less than six, should be fitted (removable) in a frame to stand upon the table, and it is desirable that duplicates be sent for exhibition in the optical lantern. They will only be eligible for award when both the negatives and slides are the work of the exhibitor.

Photographic lantern slides will be shown with the society's optical lantern during the exhibition. The loan of slides for this purpose is invited; they must not exceed $3\frac{1}{4}$ inches in height, and, to enable the committee to select and arrange them, must be delivered at the gallery not less than one week before the evening of their being shown in the lantern.

It is to be distinctly understood that the sending of exhibits signifies acceptance by the exhibitor of the decision of the council, upon all matters connected with the exhibition, as absolute and final. The council do not hold themselves responsible for any damage that may happen to the pictures, or other exhibits, whilst in their custody, but they will take every precaution to insure their safety and prompt return to the owners at the close of the exhibition.

To avoid damage to frames, exhibitors are requested have sunk backwards to their frames, with the fastening nails not projecting, and the whole covered with thick brown paper.

REMOVAL OF EXHIBITS.—Exhibits received in packing-cases will be repacked and despatched directly after the close of the exhibition. Exhibits left at the gallery by hand must be fetched away on the day appointed, due notice of which will be sent to the exhibitors. Particular attention is requested to the removal of exhibits on the day appointed. If not taken away then, considerable expense is incurred by removing them from the gallery to be warehoused which will be charged to the exhibitor. Exhibitors not being able to send to the gallery, can, by giving instructions to the Assistant Secretary, and paying the cost, have their pictures packed in a case and sent to destination by carrier.

Blank entry forms and any further information respecting the exhibition, apparatus, lantern slides, also nomination forms for membership, can be obtained from the Assistant Secretary, Edwin Cocking, 5a, Pall Mall East, S.W.

A. M. MANTELL, CAPTAIN, R.E.

8 Mansion Row, Old Brompton, Chatham.

Hon. Secretary.

July, 1890.

OUR ILLUSTRATION

IS the outcome of a series of experiments made with commercial orthochromatic plates to determine the advantages to be attained by their use in general landscape photography, with only such means as come within the scope of the average amateur. The plates used were Cramer 30, Leed 23, Carbutt 16, Carbutt special and orthochromatic, and Vogel's eosine of silver plates. As the great heat of the weather precluded the staining of any of the ordinary plates, the test narrowed down to the various plates as bought. The lens used was an ordinary Darlot stop F 8. The subject selected was a romantic glen on Crum Creek, in Delaware Co., Pennsylvania. Beautiful as is the scene, it presents difficulties to the photographer not easy to overcome. As will be seen, the glen is dark, except when the sun breaks through the foliage, and shines brightly upon the water as it falls over the dam, thus presenting all contrasts of light and shades of green. It was necessary to sit the camera up in the swift-running-stream, under the overhanging branches of the surrounding trees. The use of color-screens had to be abandoned on account of the movement of the leaves, while the exposure was lengthened to double the time which would have been given to an ordinary well-lighted subject. The experiment fully demonstrated the superiority of the orthochromatic plate for landscape work,—provided the proper developer be used, one that will allow sufficient development to bring out full detail in the shadows, and at the same time give the requisite density. Every developer is not suitable for orthochromatic plates; this is especially true regarding the eosine silver plate. Our favorite developer for color-sensitive plates has always been:

I.—Pyro	2 drs.
Citric acid	15 gr.
Oxalic acid	15 gr.
Water, dist.	4 oz.
II.—Carb. Soda	3 oz.
Sulphite soda	3 oz.
Water, dist.	16 oz.

For use, 2 dr. No. I.; 4 dr. No. II.; water, 3 oz.; bromide, 1.10, 3 drops. While this developer always worked satisfactorily with the Carbutt and other plates, it did not give enough density with the Vogel eosine of silver plate. To overcome this difficulty we tried various developers; hydrochinone being apt to fog, while eikonogen did not give dense enough shadows. After much experiment we found a developer to act satisfactorily, as may be judged by our illustration. Should subsequent experience prove the correctness of our judgment, the following formulae may fill the long sought for universal developer for color-sensitive plates, as well as ordinary plates, viz.:

I.—Sulphite of soda	5 drachms.
Eikonogen	45 grains.
Hydrochinone	15 grains.
Water, distilled	8 oz.

Heat water to boiling point, and add the sulphite of soda; when dissolved add eikonogen, then the hydrochinone. Shake until thoroughly dissolved. After this solution has stood for ten hours add: Carbonate of potash, 1½ dr. For use, take equal parts of developer and distilled water. The picture should come up quickly and perfect in all details, with full density in the shadows.

J. F. S.

PHOTOGRAPHY IN PORTGUAL.

A NEW star has appeared in the firmament of photographic literature. It has risen in far-off Portugal: *The Boletim do Gremio Portuguez de Amadores Photographicos*. It is published under the direction of Antonio Dias da Costa, Juliano Machado, and Arnaldo Fonseca, of the Photographic Society of Lisbon. The *Boletim* contains 32 pages of instructive matter, and is embellished with a print on Pizzighelli paper with platinum; this is a view of the "Payzagem de Cezimbra," from a fine negative by Sr. Dias da Costa, as the *Boletim* informs us "que hoje publicamos, foi conseguido nas seguintes condicoes." It was made with a Dallmeyer rectilinear, focus 22 c.m. developed with pyro; exposure one second, and was developed in 10 minutes. We wish our new contemporary long life and success. In one thing we envy the new enterprise. By reference to their prospectus we find their charges for advertising are set down as \$1000 per page for a single insertion, with a discount of 5, 10, and 20 per cent. respectively, if continued for three, six, or twelve months. We are willing to take several pages of Portuguese ads. at the same figures. The subscription price for the *Boletim* is \$2400 per year, or \$200 for a single number. No discount,—no chromos. While perusing the above, the thought was revolving in the mind of the writer whether that would not be a grand field for him to emigrate to, provided the photographic editors were paid in proportion to the advertising and subscription rates. Pinnacled and turreted castles arose before our eyes; the horizon assumed a roseate hue as we saw ourselves in the far-off land of port wine and raisins, grinding out "Farmulario, Reveladores, Annonces, Revista das Jarnaes," etc., for the instruction of the Senhor Socios de Amadores Photographicos. But while thus building castles in the air our confrere, who had read the rates, asked whether we knew that it took 100 Portuguese dollars to make an American ten cent piece; the disenchantment was almost too great, ice restored us, and we are still on the AMERICAN JOURNAL OF PHOTOGRAPHY.

ADOLPHE.

PROF. J. M. EDER, in his *Jahrbuch für Photographie für 1890*, recommends the following eikonogen-soda developer:

A—Water	3 liter.
Sulphite soda	200 gr.
Eikonogen	50 gr.
B—Water	1 liter.
Cryst. carb. soda	150 gr.

For use 3 parts A, 1 part B solutions, to be kept in separate bottles. Fresh developer always be used for portraiture. As a restrainer, use the usual bromide solution 1.10.

THE *Photographisches Wochenblatt*, Aug. 7, 1890, publishes an endorsement of the new photographic objective of Dr. E. Hartnack, of Potsdam. These new lenses prove of especial value for cameras of the so-called hand or detective type, the results being remarkable free from distortion and perfectly rectilinear. The article is illustrated with a reproduction of an instantaneous view of an aquarium, showing the extreme rapidity of the new lenses, together with the sharpness of definition.

The well-known optician, Carl Zeitz, in Jena, has taken out a patent on a double photographic lens of novel construction, in which the new optical glass forms a conspicuous part.

THE CONVENTION.

THE eleventh annual convention of the Photographers' Association of America is a thing of the past. Although held in the National Museum of the United States at Washington, favored with weather which was all that could be desired, and boomed by the installation of the Daguerre Monument, we regret to say that the convention did not attract the attention of press and public that was expected, the attendance even proving smaller than at any previous convention. The display made by the various dealers and manufacturers was fair, notwithstanding the fact that several of the leading exhibitors labored under the disadvantage of a lack of space for their exhibits. The entries for the various prizes were numerous, without however embracing anything new or above the standard of ordinary merit.

The convention was called to order by the President, J. Appleton, promptly at 10.30 A.M., August 12, introducing Prof. O. T. Mason, Curator of Ethnology of the National Museum, who bid the assembly welcome, which address proved a happy bit of inspiration. After which Mr. W. H. H. Clarke read a careful and exhaustive report on the progress of photography during the past year. This was followed by the reports of the Secretary and Treasurer, both showing a flourishing state of affairs. The next business in order was the selection of the location for the convention of 1891, and the announcement of the committees. Buffalo proved the choice of the majority, and it was so ordered.

The President then announced the committees as follows:

Committee on Nominations—E. J. Pullman, of Washington; C. W. Motes, of Atlanta, Ga.; E. P. King, of Providence, R. I.; F. W. Guerin, St. Louis; John Hood, Philadelphia. Committee on Awards—Grand prize class, C. W. Motes, Atlanta; class A, C. Canfield, New York; class B, E. P. King, Providence; class C, John Snyder, Columbus, Ohio; class D, L. W. Overpeck, Hamilton, Ohio; class E, Theo. Heinig, Dayton, Ohio; class F, E. Decker, Cleveland; class G, A. H. Plecker, Lynchburg; class H, W. C. G. Kimball, Concord, N. H.; S. L. Stein, Milwaukee, and Prof. Thomas W. Smillie, Washington.

Then followed the President's address, which completed the first day's proceedings.

On assembling the second day, the Committee on Nomination made their report, presenting the names of the following candidates for the officers of next year:

President—George Hastings, of Boston.

First Vice-President—S. L. Stein, of Milwaukee.

Second Vice-President—W. Stuber, of Louisville.

Secretary—L. C. Overpeck, of Hamilton, Ohio.

Treasurer—G. M. Carlisle, of Washington, D. C.

Several interesting papers were then read on different subjects; the proceedings of the day closing with a lantern exhibition in the evening.

On the third day the report on the monument fund was read, showing a deficiency of about \$5000. This was, however, reduced by the personal efforts of Mr. G. Cramer, of St. Louis. In the afternoon the election of officers was taken up, and resulted in the election of the slate that had been prepared, with the exception of the Secretary, W. Davis, of New York, being the chosen man. In the evening several more papers were read.

Friday, the last day, was taken up with the Daguerre inauguration.

Following is the list of awards. By one of those curious coincidences, which so often happen in competitive exhibitions, C. W. Motes, chairman of the grand prize class, himself gains the chief money prize.

AWARD OF PRIZES.

The award of prizes offered by the various photographic dealers and manufacturers was then made before the announcement of the regular awards. Anthony's prize of \$100 for the best bromide was awarded to Mr. Motes, Atlanta, Ga.; the second, \$50, to A. A. Knox, New York. Anthony's prize for landscape on climax films, \$50, to C. E. Vudenburgh, Elizabethtown, N. Y. An air brush was awarded to P. Fleming, Chicago, for the best water color, and one to C. Y. Waldeck, St. Louis, for the best black and white portrait, by the Air Brush Company. One hundred dollars was awarded to P. H. Rose, of Providence, for the best print on albumen paper.

AWARD OF PRIZES FOR PHOTOGRAPHS.

The committee on prizes then reported. The grand prize—a bronze group, entitled "Nearing the Goal"—was awarded to George H. Hastings, of Boston, for the best series of three photographs illustrating the poem "Enoch Arden." The other prizes were awarded as follows:

Class A—S. L. Stein, Milwaukee.

Class B, portrait photography—First, Dana, New York; second, J. Landy, Cincinnati; third, O. P. Scott, Chicago.

Class C—First, W. Steuber, Louisville; second, J. E. Stimpson, Appleton, Wis.; third, C. O. Heinig, Dayton, O.

Class D, landscapes—First, Heinberger & Son, New Albany; second, Miss C. E. Seers, of Boston; third, Zeiboch, of Niagara.

Class E, marines—Allen & Rowell, of Boston. Architectural—First, E. W. Lincoln, Cambridgeport, Mass.; second, George H. Hastings. Retouching—First, F. S. Clarke; second, C. P. Wilcox.

Class F, enlargements—First, W. G. T. Kimball; second, Rothengatter & Dillon.

Class G, best improvement in photographic appliance—C. H. Godman & Co.

Class A, foreign portraits—First, Lafayette, of Dublin; second, Gotheil, of Königsberg, Germany; third, J. Hanna, of Auckland, New Zealand.

The committee awarded diplomas to the exhibit of burnt-in enamels of Benjamin Bros., and Werner, of Cincinnati, and a diploma to Ullman, of New York.

How photography expands at the present time, from day to day, is apparent to most all observers, and it will not be long before all barriers within reason are removed in all civilized countries. So strong in this demand, that the prefecture of police in Paris has been forced to relax the rigid rules against general amateur photography within the walls of Paris. This has only been accomplished after numerous representations from the General Syndicate of Photography, and now any respectable person may photograph in Paris without the annoyance of obtaining a preliminary authorization from the prefecture.

PHOTO-MECHANICAL NEWSPAPER ILLUSTRATIONS.—There is hardly a department in art that is so constantly and so viciously assailed as that of newspaper illustrating. The censure heaped upon the newspaper cut by the wits is occasionally deserved. To be sure, many of the pictures in the daily and Sunday papers are; to put it mildly, entirely devoid of the elements of art, but as a rule they are meritorious sketches, frequently drawn by artists of reputation. The office of the newspaper cut is truly to illustrate ; if it often fails in this it is due to the ignorance of the artist, who is unaware that picturesque effect alone, which may be destroyed by the rapid manner in which the daily paper must necessarily pass through the press, and also the poor quality of paper and ink, is inadequate to convey the impression required.

It is extremely interesting to note the changes, the evolution as it were, of the newspaper cut. From the battered, blurred, and inartistic blot that formerly disfigured the pages of the few papers that published illustrations, it has advanced to the present stage of suggestive, bold, and graceful outlines seen in the better class of journals. This advancement is due principally to the facility of reproducing by photo-mechanical means the sketches of the artists. The illustration for the newspaper should, in order to secure the best effect when printed, contain as few lines as possible. Details must be left severely alone. It cannot be clearly reproduced on paper while the press is turning out thousands of printed sheets each hour. The background must be indicated only. The ill effects that ensue when it is too fully expressed is too frequently seen to require any special comment now.

Those who like to make slurring remarks on newspaper illustrations should remember that they are not intended as finished works of art, and should also take into consideration the rapidity with which they have to be drawn and engraved. To be sure, the latter process is done by photographic means, but it is none the less wonderful, for all that, to find in the morning paper, along with the report of some important piece of news, several illustrations of the scenes otherwise described. Perhaps the newspaper portrait meets with more disfavor than any other illustration that appears in the column of a daily paper. Those who know the original of the portrait declare very seriously that they would not have recognized it had it not been for the name beneath it. While occasionally this censure is well earned, in the majority of cases it is merely an expression of the prejudices in the minds of immature critics. As a rule, the newspaper portrait is a fair one, and frequently is a fine piece of work.

So extensive has the art of newspaper illustration grown that special instruction is now given in many of the art schools to fit the pupils for drawing for photographic processes. It ought to be mentioned here that a large part of the failure of this class of illustration is due to the imperfection of some of these processes, and also to the unsuitability and frailty of several of them when subjected to the fast newspaper press.—*Public Ledger.*

THE latest reports from Herr Franz R. Veresz announce that he has succeeded in obtaining colored prints with an exposure of fifteen seconds, when formerly two or three hours were required to obtain the same effect ; moreover the results are said to be better.

GENERAL NOTES.

DURABLE SENSITISED ALBUMEN PAPER.—*Deutsche Photographen Zeitung* describes a method of preparing durable sensitive albumen paper. It is as follows:

Nitrate of silver	2½	drams.
Citric acid	2½	"
Alcohol	2½	"

dissolved in 4 ozs. of distilled water, is the sensitising bath used by the author with uniformly good success. The citric acid combines with the silver salt, citrate of silver formed, deposits frequently on the bottom of the jar. It is advisable therefore to test the bath for the quantity of silver contained, before using it, preferably so by the volumetric method. Has the bath been reduced in strength, add more nitrate. The alcohol present assists in coagulating the albumen. When about ten sheets of paper, 18x22, have been silvered on a bath of about three pints, more silver must be added to keep it of uniform strength. Experience has proved the following to be about correct for a quantity of three pints:

Alcohol	5½	drams.
Nitrate of silver solution (4.7)	1	ounce.
Citric acid solution (3.10)	1	ounce, 3 drams.

Paper sensitised upon such a bath keeps well for several months. Citrate of silver deposited should be filtered off and thrown among other silver waste, for ultimate reduction. The paper silvered had best be drawn over a glass rod, and blotted off. Another method is to omit alcohol and citric acid from the solution, but after the paper has been sensitised and blotted it is then floated with the reverse side upon a ten per cent. solution of citric acid. The former method, however, is preferable. The gold toning bath for paper made durable by means of citric acid should always be freshly made, and be decidedly alkaline. Notwithstanding the most careful washing, citric acid, if still present, would induce to a decomposition of the toning bath and a precipitation of metallic gold.

THE NEW CELLOIDIN (ARISTO) PAPER.—To increase the number of the various kinds of chloride of silver papers at present in the market seems not advisable. There is no essential difference in their quality. The best of them, the Obernetter paper, shares with its competitors a number of properties which limit its practical application, no matter how fine the results are in some instances. The new chloride of silver-celloidin paper of Dr. Kurz, of Weringerode, differs so essentially from all other similar products, that even a first trial is surprising. I have made some experiments with a sample of this paper, and will give you the results herewith. The celloidin paper has a faintly glossy, almost mat surface, so that one might believe that it could give no prints to resemble the gloss of the albumen paper. This, however, is not the case. The finished prints have a gloss as fine as any Brilliant paper. The film possesses a strong resistance, is thin and hard, and the paper can be dried between blotting paper or by artificial heat. The treatment is extremely simple. The printing is done in the ordinary way, but so deep that the shadows show a bronze tone. The sensitiveness is very great; on a dark day I obtained under a medium dense

negative good prints in thirty to forty-five minutes. Regarding the negatives, they should by no means be weak, as for aristotype paper, but just in the same condition as for albumen paper. A negative which gives satisfactory prints on albumen paper will do the same thing on celloidin. This is a great advantage, as all chloride of silver papers heretofore known printed more or less hard. The pictures come directly into the toning fixing bath from the printing frame. The bath is composed of the following :

Hypsulphite of soda	500 grams.
Ammonium sulphocyanide	55 "
Alum	15 "
Chloride of gold solution (1.200)	225 c.c.
Acetate of lead	20 grams.
Water	2000 c.c.

The fixing and toning lasts about eight minutes. The pictures assume a magnificent purple tone, while the high lights appear brilliantly white. The tone does not change much during drying, and the toning has to be continued until the desired color is obtained. Two colored prints are not obtained ; the lightest and deepest shadows have exactly equal color. A little inconvenience is that the prints will not lie flat in the tone-fixing bath ; they curl a little toward the film side, and a sufficient quantity of solution should therefore always be used. About the durability of the fixing bath I have no experience yet. I have found that still handsomer tones are obtained if less gold is applied. A fixing bath of the following composition seems to give the best results ; the toning lasts somewhat longer (about ten to twelve minutes) :

Hypsulphite of soda	250 grams.
Xmmonium sulphocyanide	20 "
Alum	10 "
Chloride of gold solution (1.200)	80 c.c.
Acetate of lead	5 grams.
Water	1000 c.c.

Many pictures can be toned at the same time. The whole manipulation is less delicate than with aristotype paper, the film appearing to be almost indestructible. In a dry state, however, it will break when bent sharply. The washing is undoubtedly much quicker than with chloride of silver gelatine. The pictures should be mounted when still in a moist condition. The simplicity of the treatment (only one bath), the handsome high lights and magnificent tone, its comparatively cheap price, and the soft, easily burnishable prints, make the chloride of silver celloidin paper a very recommendable article for practical photographers as well as for amateurs.—*Photographisches Wochenblatt.*

OUR EXTRA ILLUSTRATIONS.—The half-tone process reproductions of our entomological subjects in the present JOURNAL are the work of the Crosscup & West Engraving Company, 911 Filbert Street, Philadelphia. Mr. Fred. E. Ives, of this city, is the original inventor of this process. Our specimens show the value of the process for scientific illustrations, which are acknowledged to be the most difficult of all subjects to reproduce satisfactorily. For fidelity to the original we have rarely seen the plates equaled by any mechanical process.

BLUE PRINTS OF LANTERN SLIDES.—A well-known maker of lantern slides in this city, recognizing the fact that any one who has been compelled to make a selection of lantern slides from catalogues, without having the opportunity of seeing the stock of slides, has quickly recognized the fact that it was next to an impossibility to determine just what the character of the pictures were, the names given conveying only a faint indication of what they might be. To do away with this great annoyance, blue prints of all lecture sets published in his catalogue are furnished as fast as he is able to get them printed. These blue prints are on a sheet 6x8 inches, picture being $1\frac{1}{2}$ inches square. They are photographed from the negatives from which the lantern slides are made.

How great is the progress of mechanical photography, and the rapid strides lately made in the perfection of the various processes, becomes apparent by the following notice in a daily, viz.: Wood-engraving will be taught no more at Cooper Institute, as ex-Mayor Hewitt says that art has been destroyed by the "process" work, so it is no longer able to afford a living except to a genius. The pupils express great dissatisfaction with the decision.

"Is photography always truthful? One has but to inspect an advertisement which appears in many druggists' windows, setting forth certain claims pertaining to a preparation for producing luxuriant hair. In it we find a series of portraits of a lady said to be taken at periods of several weeks (?) apart in order to show the rapidity with which her tresses have grown; but we also find that in each she wears the same dress, in which the various folds and even creases are identical. Meantime her hair has *grown* a few feet in length." Thus writes a correspondent.—*Optical Journal*.

[That photography is truthful even in the cases quoted, is shown by the fact that it makes the fraud apparent to any but the superficial observer.]

THE people in Bordentown, N. J., lately were swindled by a stranger who represented himself to be a photographer, saying he would furnish cabinet photographs for a very low figure upon an advance payment of fifty cents on each order. He was to come the next day with his camera to make the pictures, and those who gave the stranger orders, together with the fifty cents, are still waiting for his return.

We have no pity for the victims of this swindler. If they had patronized their local photographers, as they should have done, they would not now bewail their loss. The only regret is that they get off so cheaply.

PHOTOGRAPHY is to be taught in most of the best schools in Japan, notably in the archaeological, the forestry, and the military institutes.

A MAN uniformed as a soldier, gun and all, walking stolidly back and forth all day doing sentry duty on a Sixth Avenue roof, in New York, in full view of people passing on the elevated trains, is the latest development of the misdirected advertising genius of a photographer.

MR. JAMES NASMYTH, the eminent English mechanical engineer and inventor of the steam-hammer, died in London, May 7th ult., aged eighty-two years. He was born in Edinburgh, the son of a distinguished artist. When a boy he made a small steam-engine for grinding his father's colors. In 1829 he became assistant to Mr. Maudsley in his private workshop in London. After Mr. Maudsley's death, he made himself a set of tools and began business, with a small capital, at Manchester. Besides the steam-hammer, he invented a safety-ladle for foundries, a ventilator for mines, a steam-engine for screw steamers, and a rolling-mill. He retired from business in 1857, and became an amateur astronomical observer, giving particular attention to the sun and the moon, and to astronomical photography. His monograph on the moon, prepared in conjunction with Dr. Carpenter, of Greenwich, is the most valuable English work on the subject.

IN *The Camera* (London), August, 1890, the Rev. T. Perkins, M.A., F.R.A.S., publishes an interesting and instructive article on stone henge, the most ancient specimen of architecture in England. The paper is embellished with two reproductions from negatives by the reverend writer, and is another illustration how photography assists in disseminating local historical knowledge.

THE much-heralded photograph in natural colors, which was to have appeared in one of our contemporaries in New York, did not appear in the August number of the journal as promised. In fact, it has failed to materialized. Whether the four-plate process refused to work is not stated. Perhaps the colors refused to respond to the wand of the photographic magician. However, in place of the chromo we are treated to an "artotype" of much artistic merit, a style of picture far preferable to a poor chromo.

DEVELOPING TRANSPARENCIES.—Captain Pizzighelli gives the following formula to develop transparencies:

A. Dissolve 39 grammes of citric acid in 35 c.c. of water, and neutralize with aqueous ammonia. Should too much ammonia be used, it must be removed with the aid of heat. Then add 26 grammes of citric acid, and the solution is diluted so as to make 270 c.c.

B. Solution of ferrous sulphate 1.3, slightly acidified with sulphuric acid, to prevent its oxidation.

C. Solution of chloride of soda, 1.30. To develop take

A	10 parts.
B	5 "
C	1 "

Chloride of soda is a powerful restrainer, and should be used with care.

Sulphate of iron, in a larger proportion than that indicated, retards development. By diluting the developer, we obtain prints that are soft and of less intensity. Gallic acid acts as an accelerator. It produces sepia tones. To the above solution we may add two and a half parts of a solution of gallic acid at one per cent. By this process we are certain to produce excellent transparencies.—*Revue Photographique*.

LITERARY AND BUSINESS NOTICES.

THE MODERN PRACTICE OF RETOUCHING NEGATIVES; Scovil & Adams Company, New York. No. 7 of the Scovil Photographic Series.—So great has been the demand for this practical work that it has been found necessary to reprint the edition, making the sixth edition. All the various details of retouching collodion negatives, positives, enlargements, landscapes, etc., are given in the various methods, American, German, and English. The book contains much useful information for the advanced amateur as well as the professional. The price—fifty cents—places it within the reach of all. It may be obtained at the publication office of this JOURNAL.

THE LOMB PRIZE ESSAY ON PRACTICAL, SANITARY, AND ECONOMIC COOKERY; published by the American Public Health Association.—This is a useful book of nearly two hundred pages, neatly bound in boards; it is adapted to persons of moderate and small means. It is edited by Mrs. Mary Hinman Abel, and abounds in practical household information, which will undoubtedly prove of great value to many of our professionals in localities where tintypes sell thirty-six for a quarter or cabinets at \$1.00 per dozen.

THE EASTMAN COMPANY favor us with a copy of the "Kodak Souvenir of Washington, D. C.", gotten up expressly for the members of the Eleventh Annual Convention. There are but four pages—showing views in Washington made with Kodaks: No. 1, No. 2, No. 3, No. 4, and No. 5 Folding Kodak. The paper used represents the three grades of Eastman's permanent bromide paper. The prints are reproductions made by the callotype process and are excellent. We will further say that if the Eastman Company will refer to our leading paper in the August JOURNAL, and give us results on their prepared paper equal to the pages of this souvenir, then the problem is solved and a long-felt want filled.

THE BAUSCH & LOMB OPTICAL CO., at the meeting of the American Association of Photographers, held at Washington last week, were represented by Adolph Lomb and W. Drescher. There were shown the Rapid Universal and Alvan G. Clark Lenses, with Iris Diaphragms, also special lenses for detective cameras, the new Model Diaphragm and Hoover Shutters, Prisms for Photo-Mechanical Processes, Camera Levels, Focusing and Retouching Glasses, besides a large frame wherein photographs of different sizes were exhibited, showing the capacity of the lenses with which the same were produced.

LECONS ELEMENTAIRES DE CHEMIE PHOTOGRAPHIQUE (Elementary Lessons of Photographic Chemistry); by L. Mathet (Société Générale d'Editions, Paris, 1890).—A new dictionary of photographic chemistry, a volume of 726 pages, brim full of information. Its author, M. Mathet, is first-class chemist, and keeps well abreast of the times. The work is exceedingly valuable to the photographer who is able to read the work, as it not only gives all of the chemical substances used in practical photography, but also the reasons why they are employed, how they are manufactured, and when purchased how they may be tested and impurities detected. M. Mathet is entitled to the thanks of all photographic students, to whom the book will prove a useful book of reference.

OUR respected friend, the watchman in the watch-tower of the *Beacon*, takes us to task for an error in giving credit for a quotation in our June JOURNAL. The matter is at best a small one, and if we remember rightly the fault lies not with us, as credit was given to the publication from which we clipped it. However, had we known to whom the credit properly belonged, we should have given his friend, the — Austrian, his due. We thank our brother in the watch-tower for his vigilance and correction; at the same time we cannot help adding the caution "that he of the elevated position in the tower take heed lest he fall," and that while he discovers the infinitesimal mote in his brother's eye he loses sight of the stack of cord wood in his own.

"**ECHOES FROM THE WAGON WHEELS**," heard at a regimental reunion (Boston, 1880); a monograph containing three tales, by late members of Twelfth Mass. Vol., recalling army reminiscences.—This work, of which sixty copies only were printed for private circulation, is a chef d'œuvre of the photographic art. It is entirely the work of comrade James Beale, 719 Sansom St., Philadelphia, himself a veteran of the regiment. The sheets are printed on old Berkshire liner paper in eight tints, with Windsor & Newton's artist oil colors, viz., permanent blue, crimson lake, neutral tint, burnt umber, chrome yellow, burnt sienna, lampblack and flake white. The three tales are told by a quartermaster, a teamster, and train guard respectively. Many are the recollections recalled as we glance over the pages—our mind wanders back and scenes long past once more appear vividly before us. Mr. Beale deserves credit for the artistic execution of this specimen of typographic color work.

